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METHODS FOR REDUCING THE SLIPPERINESS OF PAINTED RUNWAY MARKINGS

Thomas J. Black, III

Air Force Civil Engineering Center
Tyndall Air Force Base, Florida

May 1975

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METHODS FOR REDUCING THE SLIPPERINESS OF PAINTED RUNWAY MARKINGS

THOMAS J.BLACK III
CAPT., USAF

MAY 1975

Interm Report For Period June 1974 to Apr 1975

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AIR FORCE CIVIL ENGINEERING CENTER
(AIR FORCE SYSTEMS COMMAND)
TYNDALL AIR FORCE BASE
FLORIDA 32401

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This project investigated four test sections on asphaltic concrete (AC) and eight test sections on Portland cement concrete (PCC) for methods of reducing runway paint marking slipperiness. Periodic paint removal enables AC surfaces to maintain adequate skid resistance. Mixing small, angular aggregate with the glass spheres for the standard airfield marking maintains skid resistance at least equal to that of the adjacent unmarked pavement.

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FOREWORD

This evaluation was performed under Project DL04, Task 18.

Inclusive dates of this evaluation were 1 June 1974 through 1 April 1975. The report was submitted 15 April 1975 by the Air Force Civil Engineering Center Project Officer, Captain Thomas J. Black III.

This technical report has been reviewed and approved.

Thomas J. Black

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METHODS FOR REDUCING THE SLIPPERINESS OF PAINTED RUNWAY MARKINGS

I. PURPOSE. The slipperiness of airfield pavement markings, particularly painted runway centerlines, is of concern to aircrew members, safety, operations and maintenance personnel and commanders because of the high potential for an accident or incident for an aircraft landing without directional control or adequate braking capabilities due to slippery markings. The Commander, Air Force Systems Command, tasked the Air Force Civil Engineering Center (AFCEC) to develop an expedient technique which would simply and economically upgrade the skid resistance of airfield pavement markings to equal that of the adjacent, unpainted surface.

A. Under this guideline, AFCEC tested eight combinations of oil base paint with additives on PCC (Portland cement concrete) surfaces and four combinations of acrylic emulsion paint with additives on AC (asphaltic concrete) surfaces.

B. In a supportive effort, the Air Force Materials Laboratory (AFML) evaluated a number of combinations of paint and glass spheres for laboratory optimization of traction. It also worked on validating the amount of glass spheres required to give adequate retroreflectivity for inclement weather and night flight operations.

II. DESCRIPTION OF TEST SECTIONS. Test sections were marked close to the northeast end of inactive PCC Runway 04/22 and on an AC road near the northeast side of the airfield at Tyndall AFB FL. The sections had adequate drainage so that water ponding did not occur and thus affect the testing results.

A. Sections on PCC Pavement: The PCC surface had a burlap drag finish and all markings were applied on previously unpainted areas. The paint conformed to Federal Specification (FS) TT-P-0085 and was applied at the standard rate of 105 square feet/gallon (SF/GAL). The reflective glass spheres conformed to FS TT-B-1325, Type III.

1. Section "A" had the standard paint only. This section was used to ascertain the traction characteristics of the paint without any additives.

2. Section "B" had the standard paint application with the standard glass spheres application of 10 lbs/gal of paint. This section demonstrated the traction characteristics of standard airfield markings. It was laid out at 9 feet x 1000 feet to accommodate the diagonally braked vehicle (DBV).

3. Section "D" had the standard paint and glass

spheres application with size #11 roofing granules dispensed with the spheres at the rate of 0.5 lb/gal.

4. Section "E" had the standard paint application, but the glass spheres were applied at 5 lbs/gal, half of the standard rate.

5. Section "AA" had the standard paint and glass spheres application with size #28 roofing granules dispensed with the spheres at the rate of 0.5 lb/gal.

6. Section "BB" had the standard paint and glass spheres applied in an alternating transverse stripe pattern using 12 inch spacing (see Figure 1). The intent of the alternating painted-unpainted areas was to generate frictional resistance that would be within the frequency response range of aircraft antiskid systems. In other words, periodic contact with pavement surface texture would prevent complete deterioration of traction while on the painted areas, as sensed by aircraft antiskid system. NOTE: No correlation has been established between the frequency response of the Mu-Meter and aircraft antiskid. For this evaluation, it was assumed that the aircraft response would decrease at higher speeds.

7. Section "CC" had the standard paint and glass spheres applied in an alternating transverse stripe pattern using 6 inch spacing (see Figure 1).

8. Section "DD" had the standard paint and glass spheres application with ground glass mixed with the paint at the rate of 1.0 lb/gal.

9. Section "C" had the standard paint and glass spheres application to serve as a control section for water ponding effects and, accordingly, was not considered.

B. Sections on AC Pavement: The AC surface was relatively open graded and all markings were applied on previously unpainted areas. The paint conformed to FS TT-P-1952 and was applied at the rate of 150 SF/GAL. The reflective glass spheres conformed to FS TT-B-1325, Type III, and were applied at the rate of 10 lbs/gal.

1. Section "EE" had the standard paint and glass spheres applied in an alternating transverse stripe pattern using 12 inch spacing (see Figure 1).

2. Section "FF" had the standard paint and glass spheres application with ground glass mixed with the paint at the rate of 1.0 lb/gal.

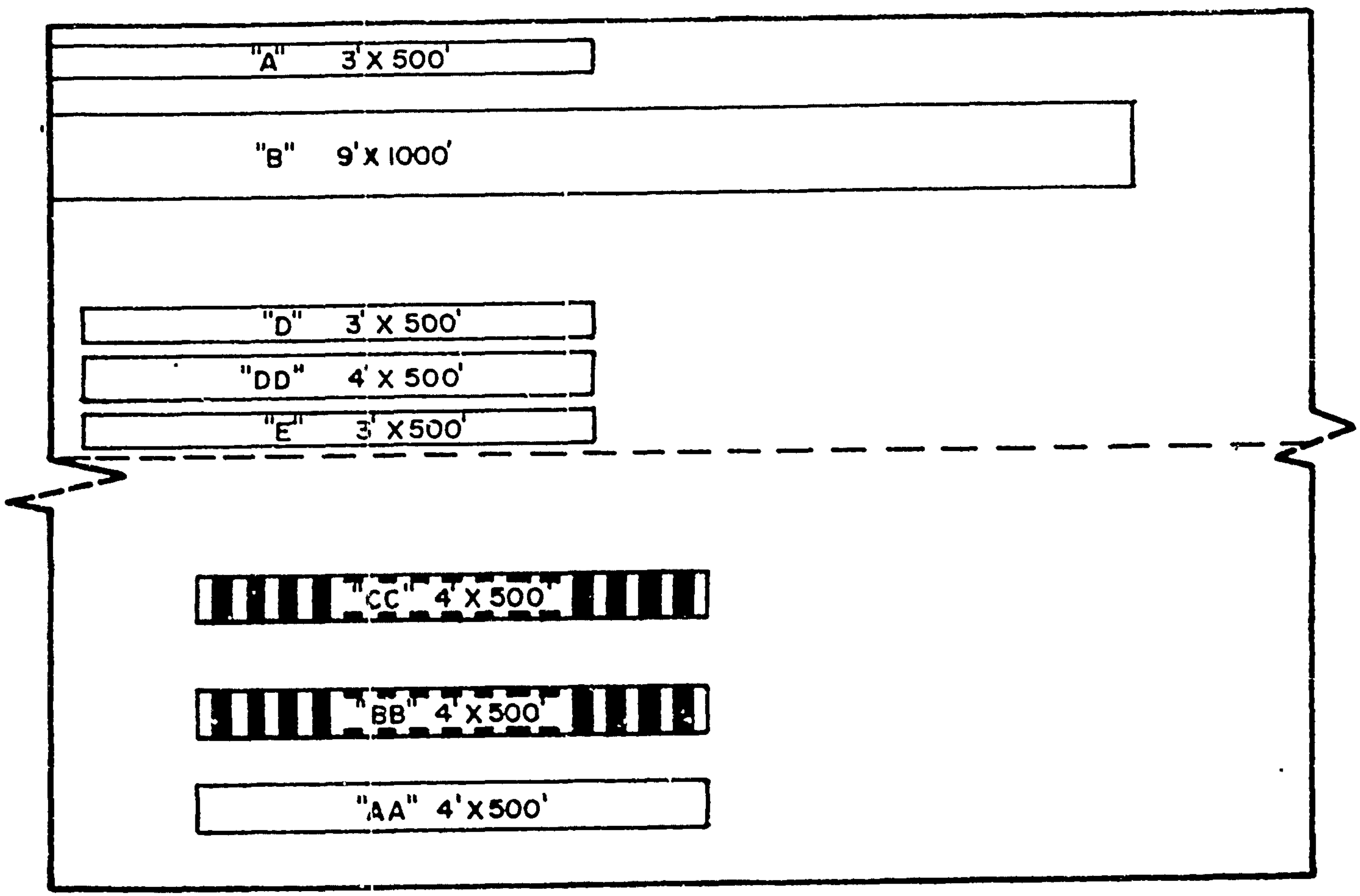


FIGURE 1. LAYOUT OF TEST SECTIONS ON PCC PAVEMENT NEAR NORTHEAST END OF INACTIVE RUNWAY 04/22, TYNDALL AFB. (NOT TO SCALE)

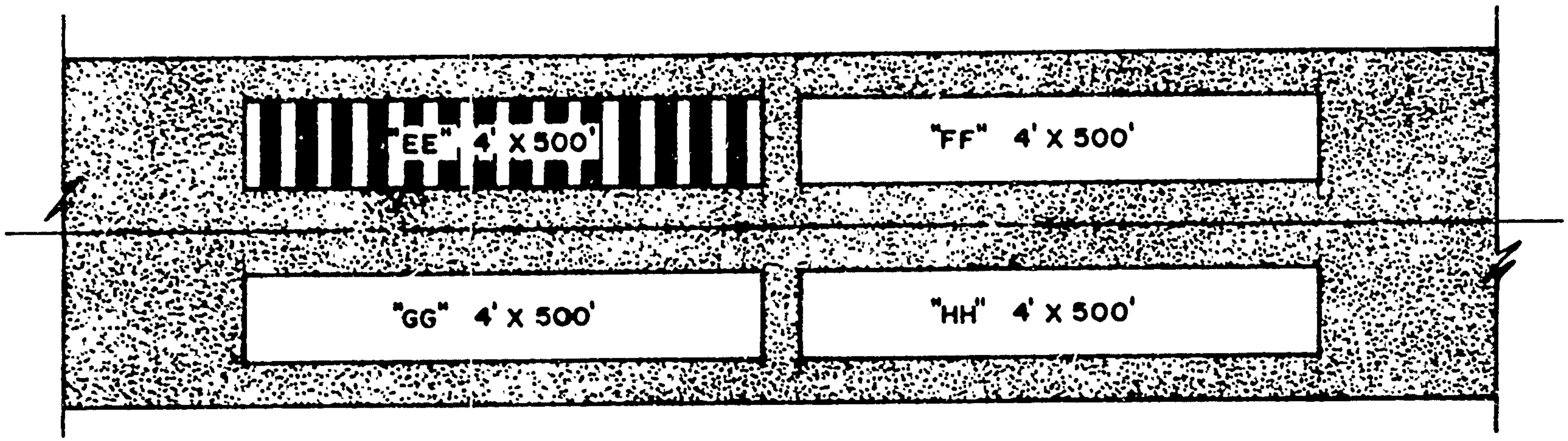


FIGURE 2. LAYOUT OF TEST SECTIONS ON AC PAVEMENT OF PERIMETER ROAD ON NORTHEAST SIDE OF THE TYNDALL AFB AIRFIELD. (NOT TO SCALE)

3. Section "GG" had the standard paint and glass spheres application with size #28 roofing granules dispensed with the spheres at the rate of 0.5 lb/gal.

4. Section "HH" had the standard paint and glass spheres application.

III. TEST PROGRAM AND EQUIPMENT.

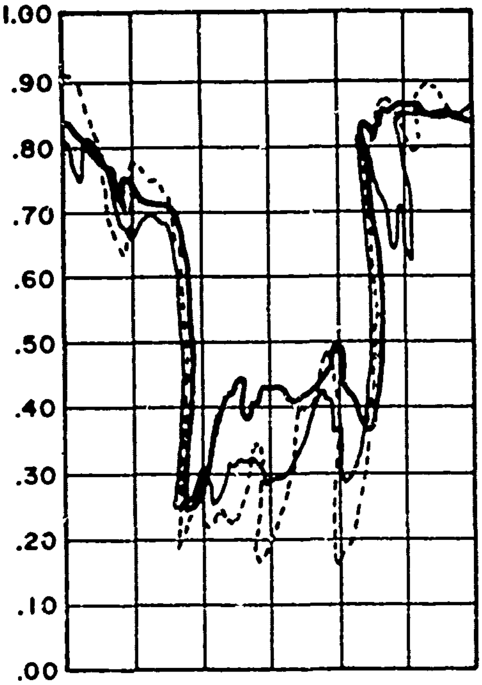
A. This evaluation was conducted in accordance with the Test Plan for Paint Slipperiness Evaluation, dated 1 August 1974 and Change 1 to that plan, dated 10 December 1974 (see Appendix A). Each test section was tested three times, once before painting and twice afterwards. The Mu-Meter made 10 to 20 runs during each test to traffic the sections and to accumulate recovery data for painted surface compared to unpainted ones. Operations were conducted in accordance with the "Procedures for Conducting the Standard Skid Resistance Tests" (AFWL TR-73-165). The Mobile Airfield Marking Team from Robins AFB GA marked all sections with their Prismo-Wald painting truck and Mark-Rite '8000' street marker.

B. The Mu-Meter was the primary test device because of its ability to work on narrow areas and determine the relative skid resistance of various surfaces. The DBV was used on one section to accurately ascertain the magnitude of traction loss due to standard paint markings and to verify the Mu-Meter's capability to measure skid resistance on the test sections.

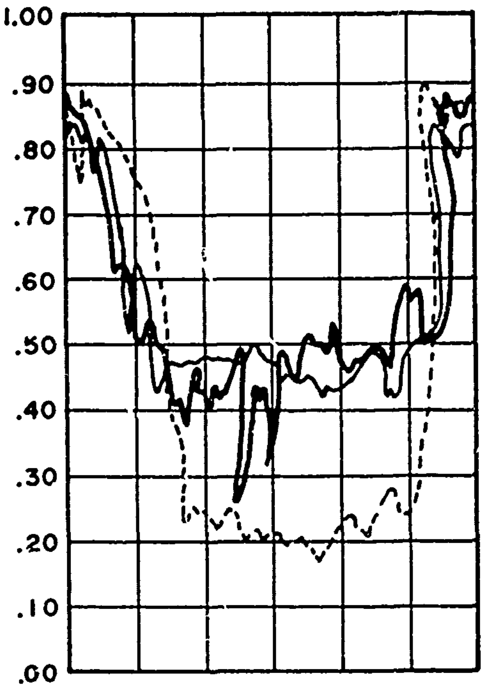
IV. TEST RESULTS. The comparative Mu-Meter traces for the before and after paint testing for each of the 12 test sections are shown in Figures 3 and 4. The second after-paint results are of primary interest.

A. PCC Pavement: The pre-paint testing showed that the PCC surface generally had wet Mu values of 0.40 or lower. These values fall into the marginal traction response zone and are described as indicating "potential for hydroplaning" (see Table 1). The standard paint and glass spheres of Section "B" exhibited a loss of Mu of 0.2 to 0.3 compared to the unpainted surface. Both patterned sections ("BB" and "CC") showed significant traction improvements over bare pavement. The size 28 granules ("AA") improved traction somewhat, but the larger size 11 granules ("DD") failed to maintain bare pavement traction values. The ground glass mixture ("DD") equalled the pre-paint values, but deteriorated rapidly with wear.

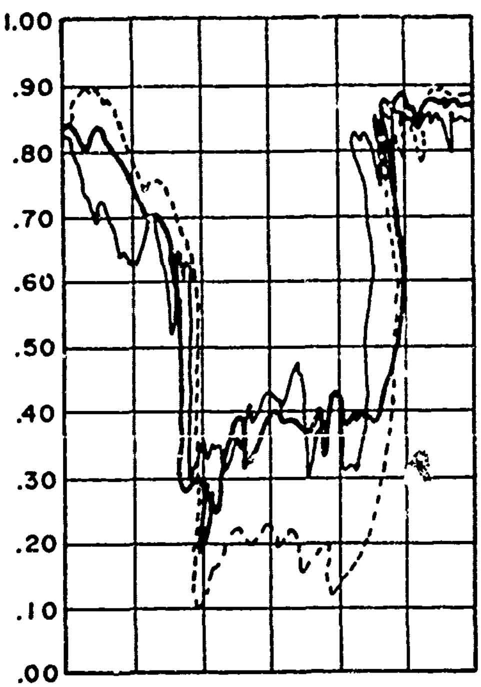
B. AC Pavement: The pre-paint testing showed that the AC surface had good to excellent traction. The standard



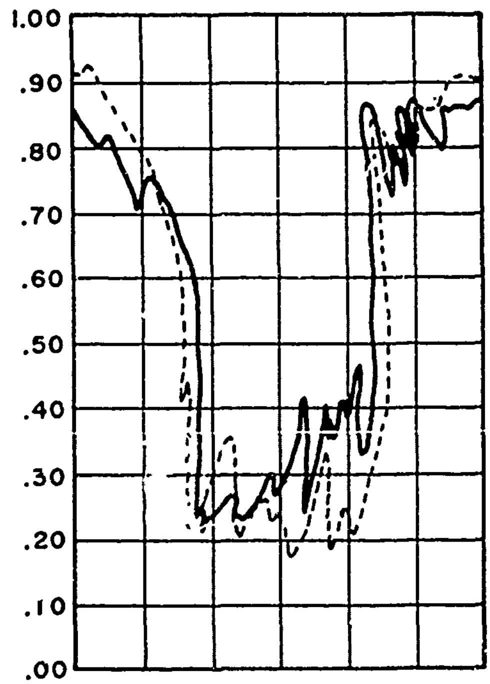
a. Section "A". Standard paint.



b. Section "B". Standard paint and glass spheres.



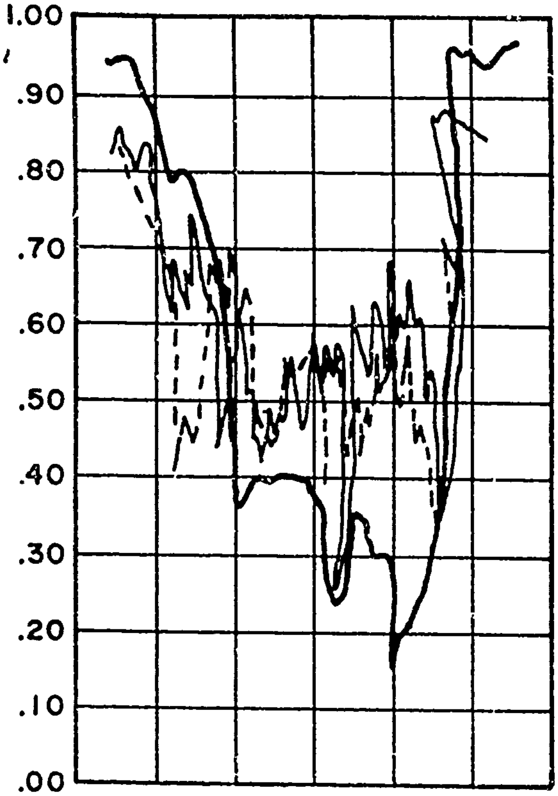
c. Section "D". Standard paint and glass spheres plus #11 granules.



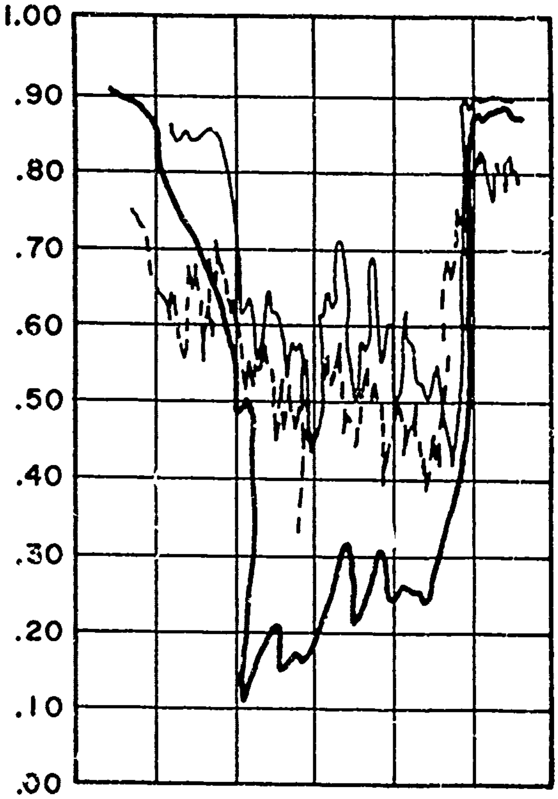
d. Section "E". Standard paint and glass spheres plus #11 granules.

BEFORE PAINT
FIRST AFTER PAINT
SECOND AFTER PAINT

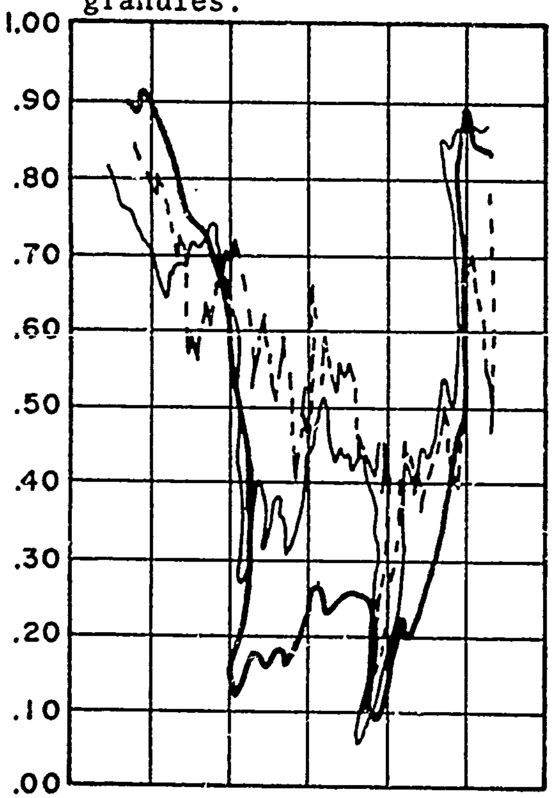
FIGURE 3. COMPARATIVE MU-METER RESULTS FOR MARKINGS ON PCC PAVEMENT BEFORE AND AFTER PAINTING.



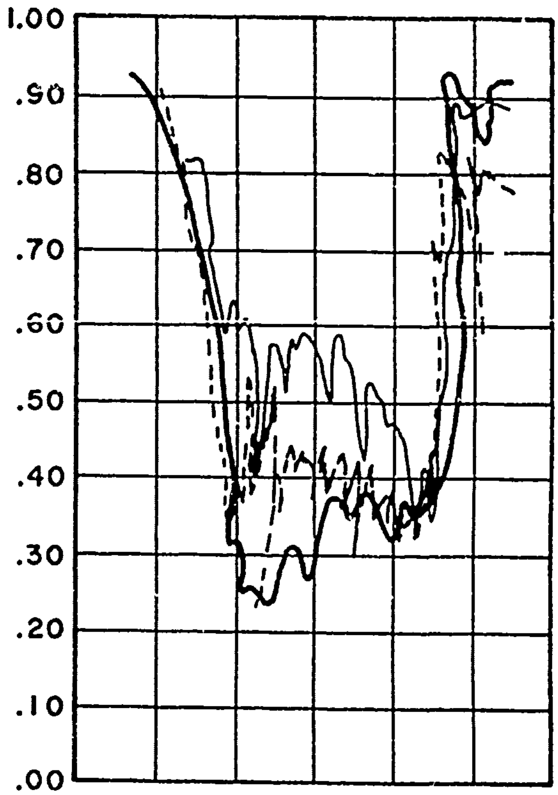
e. Section "AA". Standard paint and glass spheres plus #28 granules.



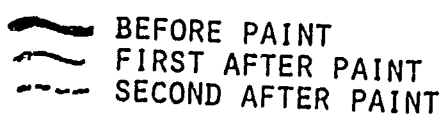
f. Section "BB". 12 inch pattern.



g. Section "CC". 6 inch pattern.



f. Section "DD". Standard paint and glass spheres plus ground glass.



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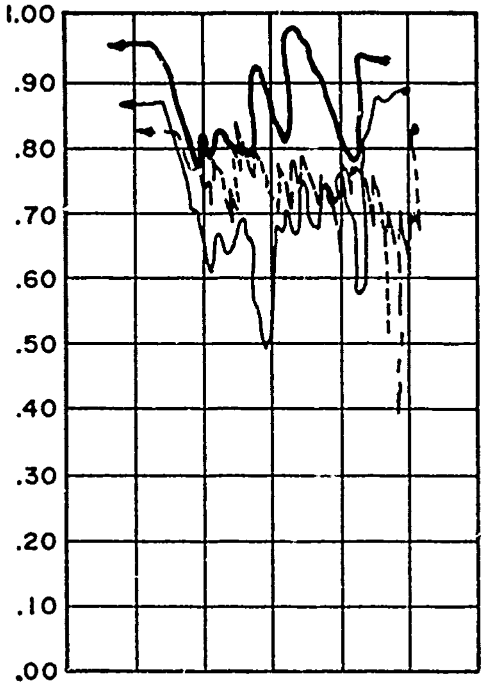
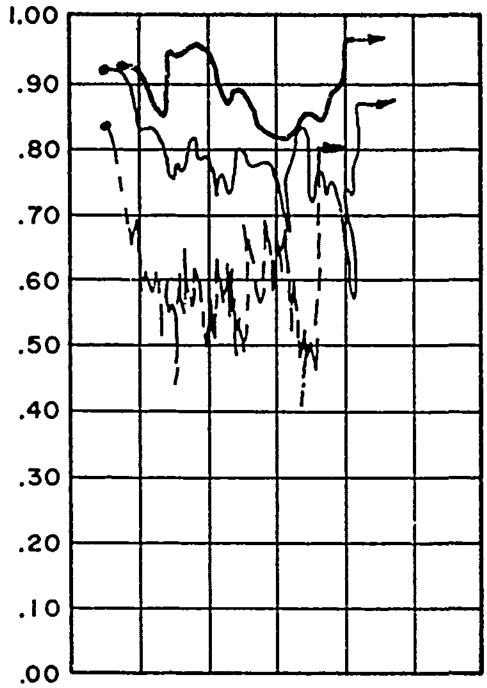
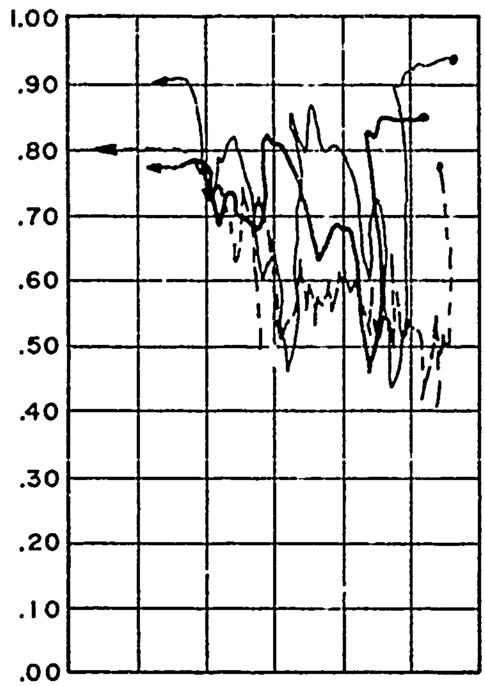


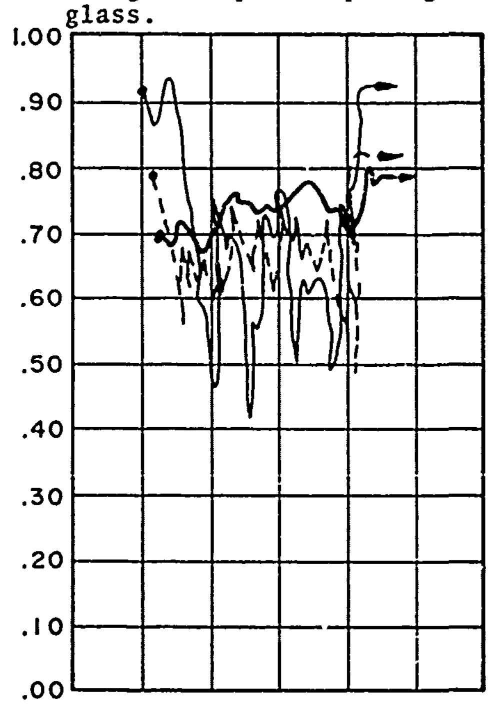
a. Section "EE". 12 inch pattern.



b. Section "FF". Standard paint and glass spheres plus ground glass.



c. Section "GG". Standard paint and glass spheres plus #28 granules.



d. Section "HH". Standard paint and glass spheres.

BEFORE PAINT
FIRST AFTER PAINT
SECOND AFTER PAINT

FIGURE 4. COMPARATIVE MU-METER RESULTS FOR MARKINGS ON ACC PAVEMENT BEFORE AND AFTER PAINTING.

paint and glass spheres of "HH" lowered the wet Mu values about 10%. The other three test solutions had poorer performance than the standard marking.

C. DBV Data: Only Section "B" was constructed to accommodate the DBV. The pre-paint test had a stopping distance ratio (SDR) of 1.96 (stopping distance was 586 feet) while the standard paint and glass spheres increased the SDR to 2,91 (stopping distance was 875 feet [see Table 1]). According to the Pavement Rating Table, this painted surface has "potential for hydroplaning."

TABLE 1[1]
PAVEMENT RATING TABLE

STOPPING DISTANCE RATIO	MU	EXPECTED RESPONSE
Less than 2.0	Greater than 0.50	No hydroplaning problems are expected.
2.0-2.5	0.42-0.50	Transitional.
2.5-3.5	0.25-0.41	Potential for hydroplaning for some aircraft exists under certain wet conditions.
Greater than 3.5	Less than 0.25	Very high probility for most aircraft to hydroplane.

[1]AFWL TR-73-154, "Procedures for Conducting the Standard AFWL Skid Resistance Test."

D. The AFML study demonstrated that 0.5 pounds of granules per gallon of paint is the optimum loading for size #28 granules, but that the granules abraded more readily during laboratory testing than a processed sand aggregate cover. AFML is studying sand substitute mixes which could provide equivalent traction characteristics and a lower cost material. Retroreflectivity measurements have not been accomplished as yet due to lack of suitable testing equipment. AFML plans to pursue this aspect of the airfield marking evaluation as soon as suitable procedures are formulated. AFML will publish the results of such work under separate cover.

V. DISCUSSION OF RESULTS. The pre-paint testing established that both the PCC and AC surfaces were very typical and any results of evaluations could be logically extended to most airfield pavements.

A. PCC Pavement Results:

1. The standard paint and the standard paint with glass spheres applications reduced the skid resistance of the pavement surface because the paint sealed the PCC; i.e., the grittiness of the microtexture was eliminated. The reduced bead application produced the same absolute Mu value although the comparative before and after results were much closer. This effect lead to the consideration that the sphere application rate has a minor influence for skid resistance of paint markings on PCC, but for economic reasons, it might be worthwhile to use a lesser amount.

2. The two different size roofing granule applications gave very different results. The larger (size #11) granules, which initially produced traction equal to that of the pre-paint test, deteriorated rapidly with wear. This was attributed to possible poor application techniques that yielded low bonding or, more likely, the bonding which occurred was inadequate to hold the particles when the normal force of tire loading was repeatedly applied. The small (size #28) granules did not abrade and seemed to compensate for the tempering of the pavement surface texture. The comparative traces in Figure 3e indicate that the small granule test section wore well and provided at least as much traction as the unpainted pavement. The dispensing rate was based on an estimate and thus may not be optimized for skid resistance; however, due to the mixing technique and possible segregation from the glass spheres in the holding tank, the application rate should not be lowered significantly below 0.5 lb/gal.

3. The mixture of ground glass and paint maintained the skid resistance of the test section through two test cycles, but deteriorated very rapidly with trafficking. The glass particles either polished under loading or eroded from the paint matrix. The particular reason was not discernable although the section did appear to take on a gloss after several test runs indicating polishing. The incorporation of ground glass into the paint prior to loading into the spray tanks was a very laborious, time consuming task and constituted a major disadvantage of this procedure.

4. The two patterned applications seemed to cause a macrogrooving effect which permitted the Mu-Meter to maintain effective contact with the surface at a frequency which caused actual rise in the traction level. No significant difference was apparent when comparing the absolute Mu values of the 6

inch and 12 inch patterns. No further testing was accomplished to determine where the optimum longitudinal dimension occurred, but from the application standpoint, a longer bar would be better. Intuition would guide one to a length range of 18 to 24 inches. Additionally, no testing was performed to assess the visual acceptability of this marking system.

B. AC Pavement Results: All four AC test sections reacted in the same fashion. The texture of the pavement surface was the major influence on the composite surface's skid resistance characteristics. With the exception of the ground glass section, all techniques resulted in the same small relative traction loss between the painted and unpainted surface. This indicates that the paint did not obliterate the microtexture or macrotexture of the AC surface. No field assessment was made of the effect of paint accumulation, but from past experience with the paint application thickness and surface texture, a semi-quantitative analysis indicated three or four coats of paint would finally override the effects of AC surface texture and reduce the traction level on the marking.

VI. CONCLUSIONS AND RECOMMENDATIONS.

A. Conclusions:

1. Paint markings (single application) on AC pavement do not reduce the skid resistance of the surface an appreciable amount. The natural texture of the AC dominates the surface effects until paint accumulations completely fill the intergranular channels to form a relatively textureless surface.

2. Paint markings on PCC pavement can cause a significant loss of traction if it is not moderated by remedial measures which counteract the slippery effect of the paint. The small amount of natural texture on PCC surfaces causes the paint to immediately become the primary influence for skid resistance.

3. Applying paint markings in a bar pattern equalizes the skid resistance of the marking with that of the adjacent pavement surface.

4. Dispensing size #28, angular roofing granules with the glass spheres equalizes the skid resistance of the paint marking with that of the adjacent pavement surface.

5. While a mixture of ground glass and paint does marginally improve skid resistance, the difficulties of properly incorporating the ground glass into the paint makes this a most undesirable solution.

B. Recommendations:

1. Remove all accumulated paint from the touchdown and centerline areas of an AC runway, no less frequently than prior to the fourth or fifth remarking. High pressure water removal techniques can clean and rejuvenate the original AC surface without causing textural damage.

2. Improve the traction of markings on PCC surfaces by adding small roofing granules to the glass spheres. Simple proportional mixing of the spheres and granules during the loading of the holding tank is the only new requirement for this method. No new or modified equipment is necessary. Further study is required to optimize the granule size and application. Use of uncoated granules should be investigated.

3. As a potential alternative to the previous recommendation, transverse bar patterns could be used to improve marking surface traction. This procedure requires considerable modification to marking equipment or acquisition of new equipment before operational utilization. Additionally, flight standards (USAFIFC) must evaluate and approve the visual appearance of this pattern before utilization. USAFIFC indicated in their letter of 18 April 1975 to AFCEC that they presently do not have a capability to perform a valid flight evaluation of this proposed marking system.

4. The glass sphere dispensing rate should be reduced for both skid resistance and economic considerations if the current AFML study substantiates adequate retroreflectivity at a reduced level.

5. Remove paint markings from PCC runway centerlines at about every fifth remarking to prevent excessive accumulation which can cause aircraft vibration. Remove loose and scaling paint prior to each repainting for any pavement to assure adequate bonding between the new coat of paint and the existing surface.

A P P E N D I X

TEST PLAN

PAINT SLIPPERINESS EVALUATION

TYNDALL AFB, FLORIDA

AIR FORCE SYSTEMS COMMAND

AIR FORCE CIVIL ENGINEERING CENTER

TYNDALL AFB, FLORIDA 32401

TEST PLAN

PAINT SLIPPERINESS EVALUATION

TYNDALL AFB, FLORIDA

01 AUG 1974

APPROVED:

JOHN R. HARTY, Major, USAF
Director of Laboratories
AFCEC/DL

APPROVED:

JOHN H. WILLIAMS, Captain, US
Directorate of Laboratories
AFCEC/DL

1. GENERAL. The Air Force Civil Engineering Center (AFCEC) has been tasked by AFSC/CC to determine the extent of the runway marking slipperiness problem and, if required, develop a new abrasive marking system. Although much work on aircraft hydroplaning has been performed, the problem of slippery pavement markings has not been resolved. In fact, it has not been resolved as to the degree pavement markings decrease the overall stopping performance of turbo-jet aircraft. In order to determine the skid resistance characteristics of the present pavement marking system, the AFCEC has undertaken two separate measuring efforts. First, in conjunction with the AFCEC traction team deployments, the skid resistance characteristics of centerline paint markings are being determined using the British-developed Mu Meter. However, all bases tested to date have the standard runway marking system which prevents/inhibits data collection since the marking systems are not long enough or wide enough for the measuring equipment. Therefore, test sections must be constructed to accommodate the special skid resistance measuring equipment. This Test Plan outlines the procedure to be utilized at Tyndall AFB in conducting the runway marking skid resistance testing effort.

2. REFERENCES:

a. AFWL-TR-73-165, Sep 73, Subject: "Procedures for Conducting Standard Skid Resistance Tests."

b. AFSC/CC Letter, 21 Jun 74, Subject: Personal Letter to General Jones.

c. AFCEC/CC Letter, 22 Jul 74, Subject: "Skid Resistance Testing of Runway Markings" (TO: 4756 ADG/CC).

3. TASK ORGANIZATIONS:

a. Air Force Civil Engineering Center (AFSC), Tyndall AFB, FL.

b. 4756 Air Base Group (ADC), Tyndall AFB, FL.

4. TEST OBJECTIVES. To determine the extent of pavement marking slipperiness and test a proposed antiskid marking material.

5. BACKGROUND. Aircraft tires normally transverse pavement areas that can be covered by a considerable amount of marking paint. On USAF runways, all runway marking systems are marked in accordance with AFM 88-14, Part Four, Criteria for Airfield Marking. The paint utilized for USAF runways shall meet the requirement of Federal Specifications TT-P-85 and when a reflective media is specified, the glass sphere shall conform to Federal Specifications TT-B-1325, Type III. When the

specified materials are utilized, some incidents have occurred during inclement weather which may have been attributed to skidding on painted surfaces. Since June 1974, the AFCEC has been engaged in special testing efforts to determine the skid resistance characteristics of runway markings.

6. RESPONSIBILITIES:

a. The Directorate of Laboratories of the Air Force Civil Engineering Center (AFCEC) is designated the Test Director for the Tyndall AFB paint slipperiness tests.

b. The Pavement Surface Effects Team Chief, Air Force Civil Engineering Center (AFCEC) is designated the Test Conductor. He is responsible for coordinating local support, procuring materials, conducting before and after marking tests and analyzing results.

7. TEST PROGRAM:

a. Test Description. The test site will be located on abandoned Runway 04/22 at Tyndall AFB, FL. All test sections will be placed northeast of the engine runup/trim pad area (Runway 22 end). Five special test sections will be marked on the Portland Cement Concrete (PCC) pavement by the AFLC Marking Team. One test section will be 9 ft X 1100 ft [sized in order to accommodate the diagonally braked vehicle (DBV)]. Four test sections will be 3ft X 500 ft (sized in order to accommodate the Mu Meter). The 500 ft section length was selected since one-inch on the Mu Meter chart paper equates to 450 feet traveled by the skid measuring device. The four 3 ft X 500 ft test sections will have varying amounts of glass spheres: one section will have glass spheres applied at the rate of five pounds per gallon; one section will have glass spheres applied at the rate of ten pounds per gallon of paint with roofing granuals applied at the rate of 0.5 pounds per gallon of paint.

b. Test Equipment. To evaluate the skid resistance/hydroplaning characteristics of the marked areas the following test equipment will be utilized:

(1) Mu Meter: A small trailer unit designed and developed specifically to evaluate the coefficient of friction (Mu) of runway surfaces. The Mu Meter physically evaluates the side-slip force between the tires and pavement surface. It is a continuous recording device, which graphically records the coefficient of friction (Mu) versus distance along the runway pavement. This system is also equipped with instrumentation which integrates the "Mu vs distance" curve to obtain the average coefficient of friction between any two selected points. The Mu Meter is normally operated at a constant speed of 40 mph.

(2) Diagonally Braked Vehicle (DBV): A specially designed and highly instrumented vehicle which was developed to evaluate the stopping characteristics of runway surfaces. The DBV concept was developed by NASA and designed to record the stopping distance of the vehicle in a locked-wheel mode under a diagonally braked configuration from 60 mph. Instrumentation in the vehicle records such parameters as stopping distance, deceleration vs time, velocity vs time, and velocity at time of wheel lockup.

(3) Slope Measuring Device: A 10 foot long, 5/8 X 2 1/2 in. rectangular section of aluminum with machinist's levels which can measure gradients from 0 to 2.0 percent. The slope measuring device is used to measure both transverse and longitudinal gradients in the test sections.

c. Test Preparation. Subsequent to the testing effort the following actions must be accomplished:

(1) Obtain approval from Base Operations to test on the abandoned runway.

(2) Calibrate the water dispensing truck and coordinate its use with the Base Fire Department.

d. Test Procedures. Once all equipment has been properly calibrated and all participants have been thoroughly briefed, actual testing will begin in accordance with the following procedures:

(1) Determine areas to be tested and mark test strips. All sections will be laid out using the distance readout instrument on the DBV.

(2) Measure the transverse and longitudinal slope of each 100 ft.

(3) Conduct the skid resistance test for the dry pavement condition utilizing the DBV and Mu-Meter. NOTE: DBV will not be utilized on the 3 ft X 500 ft test sections.

(4) Before test areas are marked, artificially wet each test area and conduct the skid resistance test for the wet pavement condition.

(5) After the areas are marked, conduct steps (3) and (4) above.

8. TEST SCHEDULE. The Test Conductor will develop, with concurrence of Base Operations, a test schedule for the layout and testing phases. The test schedule will be coordinated with the AFLC Marking Team, Base Operations, and the Base Fire Department. The testing will be conducted during the period 5 - 21 Aug 74.

9. DATA. The Test Conductor has overall responsibility for data acquisition, reduction and evaluation. Data collection will be accomplished in accordance with the standard skid resistance testing procedures, and all participants will be thoroughly briefed as to their data collection responsibilities.

10. COMMUNICATIONS. Prior to proceeding to the test site, coordination with Base Operations will be required. Communications between the Test Conductor and test personnel will be maintained on portable FM radios, frequency 149.275.

11. METEOROLOGICAL SERVICES. The Test Conductor will coordinate with Det 9, 12th Weather Wing for weather reports prior to and during the actual testing period.

12. TEST SITE OPERATION. Operation at the test site will be the responsibility of the Test Conductor. All work functions performed on the test site in conjunction with the test effort will be managed and controlled by the Test Conductor.

a. Security. Security will be provided at the test site by AFCEC/DL as required. Classification of this test is unclassified.

b. Safety. AFCEC is responsible for the overall safety conduct during this testing effort. The Test Conductor will maintain close liaison with the ADWC Ground Safety Officer on all safety matters. Drivers of both the DBV and Mu Meter towing vehicle will be thoroughly briefed on driving safety while operating at high speed on wet surfaces, to include wearing of protective equipment and the requirement to remain well clear of active runways. In the event of a mishap the following procedures will be followed:

(1) The senior supervisor at the test site will direct appropriate first aid.

(2) If requested, ambulance service will be notified by calling extension 2333 or initiating request through the base fire department. The nature of the accident, apparent condition, and location of injured will be reported to the hospital.

(3) The Test Conductor will notify the AFCEC Safety Officer/NCO, who in turn will initiate appropriate mishap reporting procedures in accordance with AFCECR 127-1.

c. Visitors. Due to the inherent problems of working on an airdrome, all personnel who desire to visit the test site must be approved and briefed either by the Test Conductor or Test Director.

AIR FORCE SYSTEMS COMMAND
AIR FORCE CIVIL ENGINEERING CENTER
TYNDALL AFB, FLORIDA

TEST PLAN
CHANGE 1

PAINT SLIPPERINESS EVALUATION
DL-04-18

10 DECEMBER 1974

APPROVED

J. L. R. Harty

JOHN R. HARTY, Major, USAF
Director of Laboratories

APPROVED

John H. Williams

JOHN H. WILLIAMS, Capt, USAF
Chief, Traction Division

TEST PLAN
CHANGE 1
PAINT SLIPPERINESS EVALUATION
10 DECEMBER 1974

Para 2d (added) - AFCEC/CC Letter, 29 Oct 74, Subject: Personal Letter to General Phillips.

Para 7a - Additional testing will be conducted to investigate the effects of placing ground glass and #28 size roofing granules in the paint, to investigate the behavior of a new acrylic paint on asphalt concrete (AC) pavement and to investigate the effect of patterned markings in lieu of solid markings. The test site will be on abandoned runway 04/22 adjacent to the original test location and on the AC paved road between the munitions storage road and the airfield. Four special test sections will be marked on the AC pavement utilizing the acrylic paint. Three test sections will be 4' x 500' and one test section will be 4' x 900' with half marked with 6" stripes and half marked with 12" stripes. Acrylic paint will be applied to all four sections at 105 SF/gal and standard glass spheres applied at the rate of 10 lb/gal. One section will have ground glass mixed with the paint at 1 lb/gal and one section will have # 28 roofing granules mixed with the spheres at 0.5 lb/gal. Four special test sections will be marked on the PCC pavement. All will be 4' x 500' and will have TT-P-85 paint applied at 105 SF/gal with spheres applied at 10 lbs/gal. One section will have # 28 roofing granules mixed with the beads at 0.5 lb/gal; one section will have ground glass mixed with the paint at 1 lb/gal; one will have 6" stripes; one will have 12" stripes.

Para 7b - The DBV will not be utilized on this additional testing effort. Any relative improvements in these sections will be assessed utilizing the Mu-Meter.